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Conserving Water in the Landscape

Conserve water in a landscape by following a prescribed sequence in designing and managing the site.

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Beauty and utility traditionally have been the purposes of home landscapes. Because water ---in both quality and quantity--- is becoming a limited resource, conservation has become a third goal. The homeowner can achieve all three by using careful, comprehensive planning.

You can reduce water consumption by 40-80 percent by following an appropriate sequence in designing and managing your site. This includes:

1. a well planned design,
2. use of adapted, drought-tolerant plants,
3. proper irrigation,
4. soil improvement,
5. mulches, and
6. appropriate, timely maintenance.

This NebGuide will briefly discuss each step. You can find additional information in the references

listed at the end of this publication.

Planning the Landscape

Careful planning must precede construction and planting. First, do a site analysis. Test your soil. Record wind speed and direction. Record sun and shade patterns. Record the pattern of water movement. Note the existing slope of the land. Identify and learn the characteristics of existing plants. This information will influence how you select and place plants. It also will guide you into thinking carefully about where to place the patio, the possible need for a windbreak, and the benefits of soil modification and land reshaping.

The second planning step is to analyze intended use of the area. Identify which activities will occur where on the site. Do you need a play area? Of what size? For what games? Do you want an area for outdoor dining? What times of the day will it be used? Will you need a storage area? Do you plan a compost?

Now develop a budget and timeline for purchases and labor. All this early mental labor will save you money and water.

Selecting Plant Material

Historically, up to 50 percent of the water used at a residential site is applied to the landscape. A significant part of this water is intended for turf. Consequently, the success of your conservation plan will depend on the characteristics of the grasses in your lawn and the efficiency of your irrigation.

Minimize the use of Kentucky bluegrass; it is shallow rooted and requires a lot of water to remain green. Use Kentucky bluegrass where its special attributes are needed. It is ideal for areas planned to be especially beautiful or for high use areas that require this species' recuperative ability. Another way to conserve water is to use Kentucky bluegrass, but rather than frequently watering it during hot, dry weather let it go brown and dormant. In this case, its water needs are comparable to those of tall fescue.

Tall fescue has a deep root system and will extract more water from a given site than Kentucky bluegrass, making it easier to keep green. (You will use as much water as you do to keep Kentucky bluegrass alive but dormant.)

Buffalograss requires little additional water, resists drought, tolerates temperature extremes, and requires little mowing or fertilizing. Like all plants, however, it has limitations. For example, it greens-up late in spring, turns brown in early fall, and is relatively intolerant of shade and traffic.

Many ornamental grasses can be incorporated into a water conserving landscape. Low growing forms such as sideoats grama, blue grama, and little bluestem provide excellent groundcover. Taller grasses such as big bluestem, Indian grass, and zebra grass can be used in border plantings or in massed plantings.

Numerous herbaceous plants, trees, and shrubs are well-adapted to water conservation. Learn how plants respond before incorporating them into your landscape plan *(see Table I)*. Some plants survive by going dormant, but their brown appearance may not be acceptable to you. If so, look for plants that will stay green with little water.

How little water? Research is needed to establish accurate water-use rates for ornamental plants in

Nebraska. Research also is needed to learn how to effectively use native woody and herbaceous plants in water-conserving landscapes.

When selecting a turfgrass species, consider which of the following qualities are most important in your landscape plan and choose a turfgrass which meets your needs. Following is a list of how turfgrasses rank according to their tolerance to soil acidity, drought, cold, heat, and shade; wearability; and fertilizer requirements.

Soil acidity tolerance of popular turfgrasses ranging from most to least tolerant: tall fescue, fine fescues, perennial ryegrass, Kentucky bluegrass, buffalograss, zoysiagrass, bluegrass.

Drought tolerance of popular turfgrasses ranging from most to least tolerant: buffalograss, fine fescue, tall fescue, zoysiagrass, Kentucky bluegrass, perennial ryegrass.

Cold tolerance of popular turfgrasses ranging from most to least tolerant: Kentucky bluegrass, fine fescue, buffalograss, tall fescue, perennial ryegrass, zoysiagrass.

Heat tolerance of popular turfgrasses ranging from most to least tolerant:
buffalograss,zoysiagrass,tall fescue, Kentucky bluegrass, fine fescue, perennial ryegrass.

Shade tolerance of popular turfgrasses ranging from most to least tolerant: fine fescue, tall fescue, perennial ryegrass, buffalograss, Kentucky bluegrass, zoysiagrass.

The shade tolerance of grass depends on many conditions. If the site is quite damp, rough bluegrass could persist while fine fescues die. Just the opposite could occur on a dry site. Cultivars also have significant differences.

Wearability of popular turfgrasses ranging from those which can take the most to the least wear: zoysiagrass, perennial ryegrass, tall fescue, Kentucky bluegrass, buffalograss, fine fescue.

Often turfgrass cannot tolerate traffic, although there is quite a lot of variability between cultivars. For example, ‘Bensun’ and ‘Baron’ Kentucky bluegrass bear traffic rather well.

Fertilizer requirements for popular turfgrasses ranging from most to least: Kentucky bluegrass, perennial ryegrass, tall fescue, zoysiagrass, fine fescue, buffalograss.

While a lawn may exist on low amounts of fertilizer, a high-quality lawn can only be grown with increased amounts. The cultivar, soil type, and climate greatly influence fertilizer needs.

Proper Irrigation

Zone watering means grouping plants with similar water requirements. Be sure your landscape plan includes this concept so you can give the rose bed sufficient water without drowning the gazanias.

Irrigation systems will support your design if you carry your planning throughout the entire landscape. Remember that all the shrubs, trees, flowers, and turf in a given irrigation area will receive the same amount of water. The water conserving value of buffalograss will be defeated if it is in the same irrigation area as trees.

Choose the appropriate irrigation system and then install and maintain it properly. Urban horticulturists

estimate that 75-85 percent of plant problems result from overwatering. If you know daily evapotranspiration rates (combined water loss from soil and plant), you can recharge root zones without over or under watering. You can save even more if water emitters distribute water uniformly even when it is windy.

Drip and soaker hose irrigation systems place water on the soil surface in the immediate vicinity of plants' root systems, reducing evaporation loss and irrigating only to desired plants. An added bonus of these systems is the reduction in foliar diseases which can accompany sprinklers. These systems best serve trees, shrubs, and flowers.

Sprinklers are generally used for turf. If you install a sprinkler system, the rate and uniformity of application must be carefully designed. Plan emitter patterns to fit water output to the shape, soil infiltration rate, and wind characteristics of your site. If you are using a conventional hose and sprinkler, remember that the location and quality of the sprinkler head determines how efficiently water is delivered.

There is one more consideration: run-off. The conservationist wants water on the plants, not down the gutter. Careful location of emitters may not be enough to minimize run-off. You may need to reshape land to reduce slopes that encourage water to move too quickly for soil to absorb it. The slope should direct water toward the plants that are high water users and away from hard surface areas such as driveways, walks, and patios. Another way to reduce run-off is to incorporate organic matter into the soil to improve the infiltration rate and water-holding capacity of the soil.

Soils

A water conserving design depends on plants with large, dense, healthy root systems that will extract the available water from the soil. The quality of the soil environment has a significant role in developing such a root system. Furthermore, the soil serves as a reservoir for the water, oxygen, and nutrients that feed the plants.

There are two physical aspects of the soil that most often need improvement. First, the soil needs adequate pore space to provide adequate oxygen to the roots. Second, the water holding capacity of the soil often can be improved. This was already referred to as a way to minimize run-off.

If your soil needs to be modified, loosen the soil down to about 12 inches deep for turf and 18 to 24 inches for shrubs and trees. The width of the modified area for shrubs and trees usually is more important than the depth. Adding organic matter to the soil will help improve the environment for root growth. You also may need to add sulfur, phosphorus, and/or potassium. A soil test will tell you what is needed and how much to add.

Mulches

Mulches serve several important functions in water conservation. They reduce run-off from heavy rains, cool and stabilize soil temperatures, reduce crusting, minimize evaporation, and aid weed control. Mulches also can be an attractive feature of the landscape.

Excessively deep mulches can injure or kill a plant because they stimulate root growth in the mulch layer. These roots are more likely to experience winter and drought injury than those growing in soil.

Maintenance

Proper maintenance will greatly influence the longevity and beauty of your design. For example, excessively long intervals between mowings or mowings that remove more than one-third of the top growth can injure turfgrass. This stresses the plants and increases water use. You should annually core (aerate) the soil around trees and shrubs. This counteracts surface compaction that will interfere with water infiltration.

Excessive fertilization is particularly harmful to water conserving landscapes because it encourages soft, vigorous shoot growth which, in turn, uses more water. This type of growth also rapidly desiccates when stressed by wind or drought.

Deep infrequent irrigation will promote more extensive root systems then frequent, shallow waterings. This also helps water use and produces plants that are less susceptible to drought and high temperature injury.

Attentive maintenance may be the most profitable and yet most over-looked tactic in your campaign to save water.

Insect, Disease and Weed Control

An important benefit of a well designed layout and a diverse plant population is relative freedom from insect and disease outbreak. Select plant materials unlikely to be stressed by adverse environmental conditions. Healthy, vigorous plants are usually more tolerant of insect feeding and less susceptible to plant diseases. By contrast, stressed plants often provide a more favorable environment for insect pests and plant pathogens.

Weed control in these landscapes is a minor concern. Most weeds are best adapted to moist or saturated soil conditions which are not prevalent in a water conserving landscape. Weed control is also a reward for mulching.

Conclusion

You can build water conservation into your landscape by following these six steps:

1. Plan carefully, identify how various factors affect each other to solve problems while they are still fairly simple.
2. Use multiple criteria when selecting and locating plants, especially lawn grasses.
3. Plan for zone watering and regularly check your irrigation equipment and placement.
4. Improve soil.
5. Use mulches.
6. After all you have invested in planning, money, and labor, take care of what you have created. A landscape is a living whole whose many parts must be regularly evaluated and nurtured. The landscape, in return, can serve you with economy and beauty.

Additional Information

Every topic described here can be examined more fully. Extension NebGuides are available on many of them. See, for example, *Perennial Flowers for Water-Wise Gardeners,* NebGuide G94-1214. Other useful references are listed below:

Landscaping for Water Conservation: Xeriscape!
City of Aurora, Colorado Utilities Department, ISBN #09622900-1-7.
Low-Water Use Drought Tolerant Plants for Lincoln, Nebraska,
The Citizen Information Center, City of Lincoln, 1992.
National Xeriscape News,
National Xeriscape Council, Inc., P.O. Box 767936, Roswell, Georgia 30076-7936.
Ornamental Grasses for Minnesota,
A. Hanchek, M. Meyer. University of Minnesota, 1991. AG-SS-5629.
Woods Plants of the North Central Plains,
H. A Stephens. The University Press of Kansas, ISBN #7006-0107-4.

Table I. Drought Tolerant Varieties Recommended for Nebraska

Trees

Acer ginnala — Amur Maple, 25
Acer platanoides — Norway Maple, 50'
Carya sps. — Hickory, 45'
Celtis occidentalis — Common Hackberry, 60'
Cercis canadensis — Eastern Redbud, 20'
Crataegus crusgalli inermis — Thornless Cockspur Hawthorn, 20'
Crataegus phaenapyrum — Washington Hawthorn, 25'
Fraxinus pennsylvanica — Green Ash, 60'
Ginko Bilboa — Ginko, 60'
Gleditsia triacanthos inermis — Thornless Common Honeylocust, 60'
Gymnocladus dioicus — Kentucky Coffeetree, 60'
Juniperus spp. — Junipers, 25-35'
Koelreuteria paniculata — Golden Raintree, 30'
*Maclura pimifer*a — Osage-orange, 50' (thornless male)
Malus cultivars — Crabapple, 15-25'
Picea pungens — Colorado Spruce, 50'
Picea glauca 'densata' — Black Hills Spruce, 45'
Pinus banksiana — Jack Pine, 35'-40'
Pinus nigra — Austrian Pine, 50'
Pinus ponderosa — Ponderosa Pine, 60'
Pinus sylvestris — Scotch Pine, 60'
Pseudotsuga menziesii — Douglas Fir, 50'
Quercus coccinea — Scarlet Oak, 65'
Quercus imbricaria — Shingle Oak, 40'
Quercus macrocarpa — Bur Oak, 50'
Quercus marilandica — Blackjack Oak, 25'
Quercus velutina — Black Oak, 55'
Quercus bicolor — Swamp White Oak, 50'
Robinia speudoacadia — Black Locust, 60'
Taxodium distichum — Baldcypress, 50'

Shrubs

Amelancher alnifolia — Saskatoon Serviceberry, 6'
Amorpha canescens — Leadplant Amorpha, 8'-20'
Aronia meloncarpa — Black Chokeberry, 10'

Berberis X *mentorensis* — Mentor Barberry, 7'
Berberis thunbergii — Japanese Barberry, 7'
Caragana arborescens — Siberian Peashrub, 15-20'
Ceanothus americanus — New Jersey Tea, 3'
Chaenomeles species — Floweringquince, 3'-6'
Cornus mas — Corneliancherry Dogwood, 20'
Cornus racemosa — Gray Dogwood, 12'
Cotinus coggygria — Smoketree, 15'
Diervilla lonicera — Bush Honeysuckle, 5-6'
Hamamelis virginiana— Common Witchhazel, 15'
Juniperus chinensis — Juniper, 10'- 15'
Kolkwitzia amabilis — Beautybush, 10'
Ligustrum species — Privet, 15-20'
Lonicera korolkowii — Blueleaf Honeysuckle, 15'
Lonicera X *'Emerald Mound'* — Emerald Mound Honeysuckle, 2'
Physocarpus opulifolius — Common Ninebark, 10'
Pine mugo — Mugo Pine, 5'-15'
Prunus tomentosa — Nanking Cherry, 15'
Prunus besseyi — Western Sandcherry, 4'
Pyracantha coccinea — Scarlet Firethorn, 6'
Rhus species — Sumac, 6'
Ribes missourense — Missouri Gooseberry, 3'
Ribes odoratum — Clove Currant, 8'
Rosa rugosa — Rugose Rose, 4'
Sambucus candensis — Elderberry, 8'
Spiraea X *vanhouttei* — Vanhoute's Spirea, 5'
Symphoricarpos occidentalis — Western Snowberry, 3'-4'
Symphoricarpos orbiculatus — Coralberrry, 3'
Syringa species — Lilac, 10'
Viburnum lantana — Wayfaringtree, 10'
Viburnum lentago — Nannyberry, 25'
Viburnum prunifolium — Blackhaw Viburnum, 15'
Yucca glauca — Soapweed, 3'
Yucca filamentosa — Adams-Needle or Yucca, 3'

Forbs (wildflowers & perennials)

Achillea sps. — Yarrow
Antennaria species — Pussytoes
Artemisia sps. — Artemisia
Aster novae-angliae — New England Aster
Asclepias tuberosa — Butterfly Milkweed
Baptisia sps. — False Indigo
Coreopsis sps. — Coreopsis cultivars
Dalea purpurea — Purple Prairie Clover
Echinacea purpurea — Purple Coneflower
Gaillarada species — Blanket Flower
Hemerocallis sps. — Daylily
Iris sps. — Iris species
Liatris sps. — Gayfeather
Monarda species — Beebalm

Sedum sps. — Sedum
Sempervirens sps. — Hens-N-Chickens

Turfgrasses

Buchloe dacryloides — Buffalograss
Festuca arundinacea — Tall Fescue (turf types)

Ornamental Grasses

Andropogon gerardia — Big Bluestem
Bouteloua curtipendula — Sideoats Grama
Calamagrostis acutiflora — Feather Reedgrass
Eragrostis tricbodes — Sand Lovegrass
Miscanthus sps. — Eulaliagrass
Panicum virgatum — Switchgrass
Pennisetum sps. — Fountaingrass
Schizachyrium scoparium — Little Bluestem
Sorghastrum nutans — Indiangrass

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